

Neutral Beam Heating and Current Drive in MAST

Rob Akers for the MAST team.

Primary auxiliary heating on MAST ($R \sim 0.8\text{m}$, $a \sim 0.6\text{m}$) is provided by two 30-70keV ORNL neutral-beam injectors, oriented in the mid-plane, each with a tangency radius of 0.7m, resulting in near non-adiabatic orbits with Larmor radii and orbit widths $\sim 25\%$ of minor radius. Full gyro-orbit simulations of Heating and Neutral Beam Current Drive (NBCD) are being carried out using the LOCUST Monte Carlo code and TRANSP. Experimental data are provided by a suite of advanced diagnostics including a 100Hz Thomson scattering system, a multi-chord Z_{eff} diagnostic, an $E \parallel B$ scanning NPA and neutron counters. Code predictions will be compared with experimental data both for high performance co-injection heated discharges and for low current ($I_p \sim 300\text{kA}$), low-density ($n_e > 0.5 \times 10^{19}\text{m}^{-3}$) highly suprathemal co and counter injection heated plasmas where NBCD is being investigated.

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